Iñaki’s comments about “Rethinking False Spring Risk” January 15th-18th, 2018

Questions:

* What is the intended journal? This question is important for me in order to understand if you need to explain more deeply some concepts.

Comments:

Line 19. The concept “False Spring” is completely new for me. I never listen this concept before. Usually I was using “late spring frost”. I propose to change “late spring freezing events are known as false springs” by “late spring freezing events are also known as false springs”.

Line 32. Maybe you can add that for many species, the “spring” is defined as the budbreak or flowering date. We are able today to calculate more or less accurately these dates for many different species (cultivated or not). At least in my research domain (agriculture), we do not use “the spring” as a concept, we really observe a plant status (flowering or budbreak for perennials, starting vegetative growth for grass, etc…)

Lines 41-43, I think you do not need to add at this moment the references. You can directly define the topics you will explain later.

Line 56: It could be useful to add some information about how hardiness can help to scape or bear this frost events.

Equation 1: this calculation is done every year? Can you add an index in order to explain the timestep?

Line 69. This value has a signification every year or you need to calculate it during a period (the mean FSI value). There is not a Threshold for the “Day of Year(LastSpringFreeze)” parameter (for example Temp = 0°C)?? This value can vary within species.

Line 69. You can also add a short sentence to say that negative values represent “no risk situations” and positive values a risk with a threshold at 7.

Figure 1. I think you need to explain in the legend (not in the main text) how each data is calculated: ground observation, image analysis, model calculation…

Line 84-92. I do not completely agree with you. I think hypothesis you propose are right when you want to explain the variability of a community or the accuracy (precision) of the calculated value. However in this case, the differences you observe are more related to the methodology used to calculate each “spring value”. The NPN value is calculated to explain spatially a large scale the evolution of the vegetation, independently of the species. The O’Keeffe method can evaluate many different parameters: species, age, individuals values… finally, the Phenocam method can be adapted to many different species, but it depends of the are covered by the pictures… so the methodology play an important role in the value provided. In this sense, you can provide a more important framework

Line 97: how do you define “demographics and functional groups”? I am not ecology scientist and I need some examples to understand these concepts.

Line 112. You can also add January in Mediterranean areas because December and January can be quite warm. We have already some budbreaks already observed : prunus (almond), forsythia, frexus…

Section 4. Maybe you can add a comment about hardiness in this section in order to explain the differences between your work and this kind of study (I know my colleague Guillaume Charrier has published several papers about this topic).

Lines 138-146. There are some ideas in this paragraph:

* I think the concept “duration of vegetative risk” is very interesting. However, I think it could be useful to explain it in detail in the text. For example: can we consider that this DVR duration can be calculated as the period between BBCH 7 (budbreak) and BBCH 11 (full leafout)? In fact in figure 2 you do not show a difference between two species because their DVR but because their budbreak date or the beginning of the DVK period.
* I think it could be useful to do an experiment with plants where you show how tolerance decrease with time. For example you grow a population of plants and every day you take a group of this plants after budbreak and you push them under frost conditions, and you look the damages (type and %).

Lines 153- 156. According with these ideas, there are other factors that can be added to calculate DVR?

Line 157: three cues 🡪 temperature, chilling, photoperiode…? You define it in line 165. Maybe it is better to put it before.

Line 166 - 173. I do not know all the papers, but those I know, authors are not describing a link between the cues and the regions, but a link with the species. For example, Gauzere’s paper try to better explain how some species are affected by some factors using data from different regions. When we analyse an species we assume that the factors will play a role in the budbreak will be the same independently of the site. However we can imagine that we have two sources of variability: we can imagine that there is a hierarchy of the factors (some of them are very important and others are factual) and in some cases, all the factors are activated and in other only the most important; and you can also a genetic variability between populations that can change the response of the same plant to the climate.

Figure 3 is not completely clear. Legend need to be improved (lines, histograms, boxplots signification)

Line 177-184. This is maybe true for one species Ulmus glabra. This analysis can be interpreted as a climatic effect (ok) or as genetic effect (two different populations, or varieties of the same species). Which is not clear is the difference you do between genetics factors and topography/climatic factors to explain the differences and how to take them into account.

Line 186. “Some regions and species may tolerate lower temperature thresholds than others”. For me it is quite complicate to put these two elements at the same level. In some regions you have better tolerance, because they probably eliminate species with low tolerances. Moreover, species (or more specifically, populations) with better tolerance in some regions were selected for many years keeping only individuals adapted to these conditions.

Figure 4. I like a lot this figure !

Lines 191. See our paper Sgubin et al., 2018.

Figure 5. How do you calculate GDD values?

Line 237-241. I understand that these interactions are not very well known for temperate trees, however this is typically the framework that we use in different models to describe phenological development of grasslands. Development stages between beginning of growth and flowering (which are your DVR period) are calculated using forcing units and photoperiod interactions. Those interactions depend of the species: there are some species that they need both (many winter grass) and other only temperatures. For a concept model you can read Wang and Engel, 1998. Moreover it is expected to short the growth period in spring because of the increase of the temperature.

I think you need to use earlier your experimental work. I think this is a very important add of your work, and in my opinion, we discover it too late in the paper. I believe you can use it to structure the different cues and issues of your topic and to open to new studies in the future. Finally, I think it is important to describe more precisely the experiment (conditions, species (why those and not others…). It could be interesting to explain figure 6 B by species,…